$m_{Ni} = 1.67\mu_B$, при учёте моментов на атомах кислорода мы получаем значение спина $S = 3/2$ для Co и $S = 1/2$ для Ni.

Учитывая спин-орбитальное взаимодействие в приближении LDA+U+SO, удается воспроизвести отклонение магнитных моментов от идеальной антиферромагнитной конфигурации в плоскости xy. Кроме того, величина нескомпенсированного магнитного момента системы находится в разумном согласии с данными экспериментов. В дальнейшем планируется моделирование изменения величины и направления нескомпенсированного момента при помощи внешнего магнитного поля.

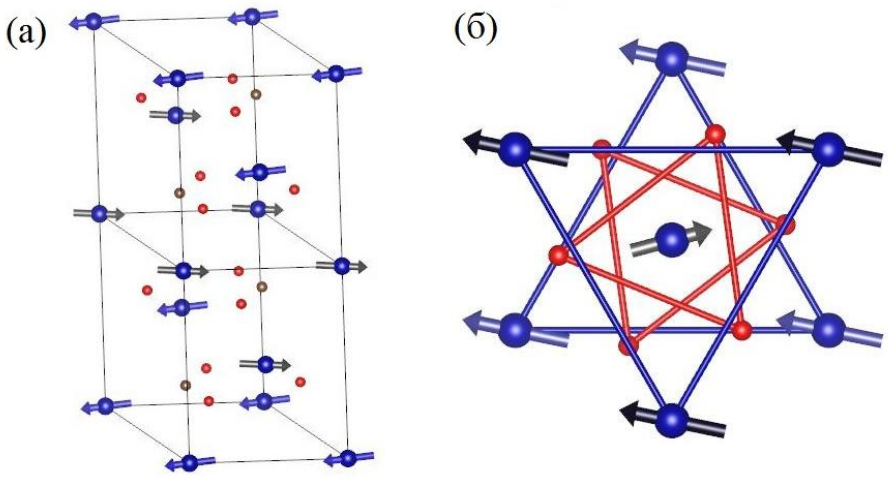

Рис. 1. (а) Электронная структура $CoCO_3$: атомы Co, O и C обозначены синим, красным и серым цветами соответственно, показаны магнитные подрешетки; (б) Вид в плоскости xy, красным обозначены треугольники кислорода

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A NOVEL METHOD OF DESIGN OF MINIATURIZED MICROSTRIP BANDPASS FILTER WITH RESONATORS

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Bandpass filters are used in different stages of the most of RF systems. The requirements for such devices, typically as follows: proper selectivity, small insertion

losses, small size, processability in manufacturing and low cost. Miniaturization of bandpass filters is one of the trends in microwave techniques.

Filters with reduced sizes are widely presented by different authors [1-4]. In [1-2] miniaturization of microstrip filters is obtained using interdigital structures which usually require vias to provide short-circuit, while in [3] two stepped-impedance resonators are used to provide low insertion losses and wide stopband. Broadside-coupled split ring resonators could also provided compact size which is shown in [4].

In this paper a new method of design of microstrip filter is presented. The proposed filter is bandpass and is used to pass signals at frequencies lying within a given band from f1 to f2. FR-4 is used as a substrate with relative dielectric permittivity 4.4, tgδ=0.02 and 1.5 mm height.

The obtained structure consists of two identical resonators and their total length is equal to the wavelength λw. The width of the strips of the resonator is 0.5 mm and the distance between them are selected to be 1 mm, which will provide a technologically realizable dimensions of the resonator. The rectangular form of a spiral is used to reduce the occupied area (calculated at the maximum protruding parts) and simplifies the design process. The experimental results were obtained using a vector network analyzer ZVA24, operating in the frequency range from 20 MHz to 24 GHz (Fig.1).

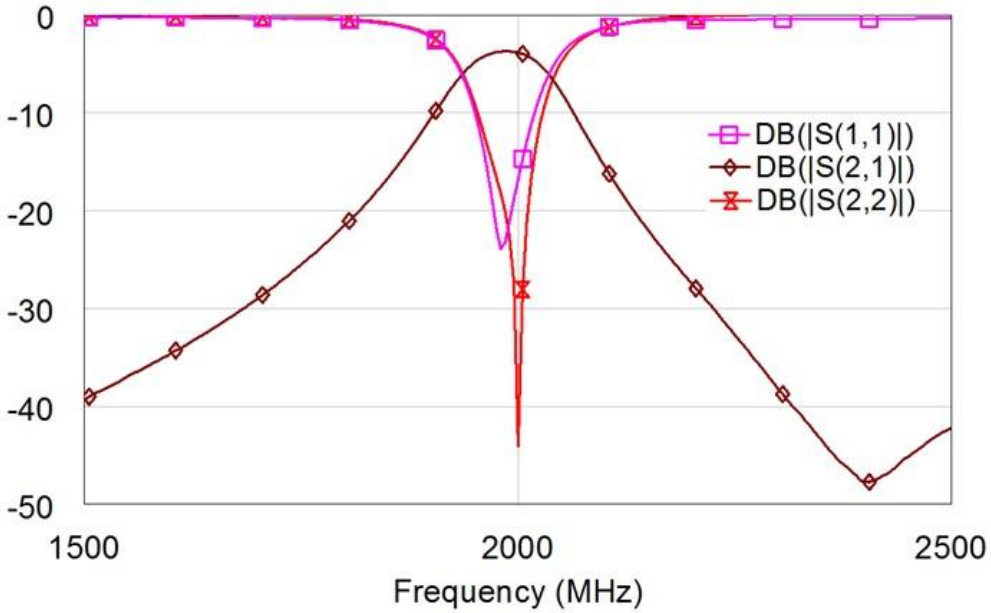

Fig. 1 The design of the resonator with feed lines

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